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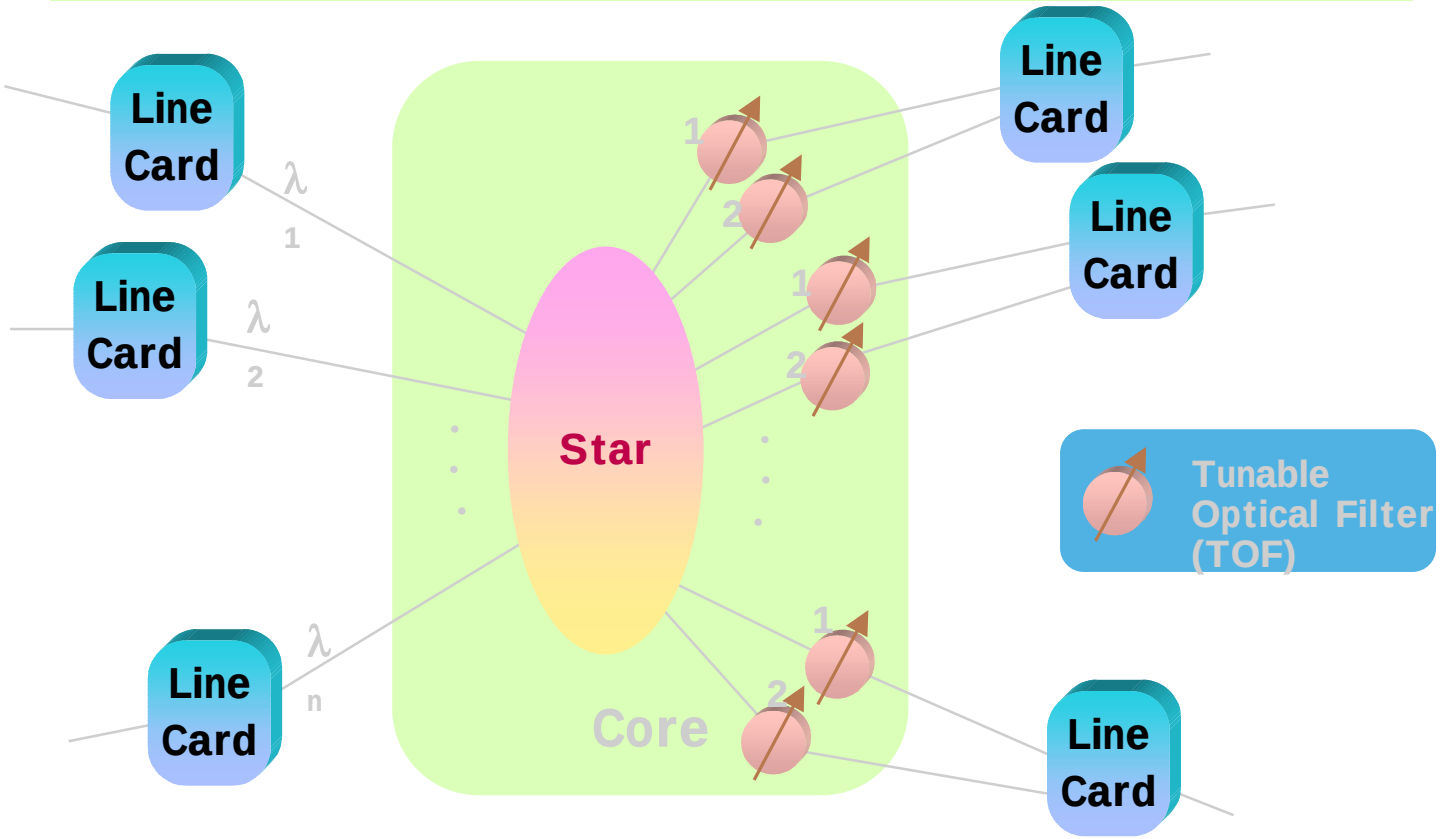
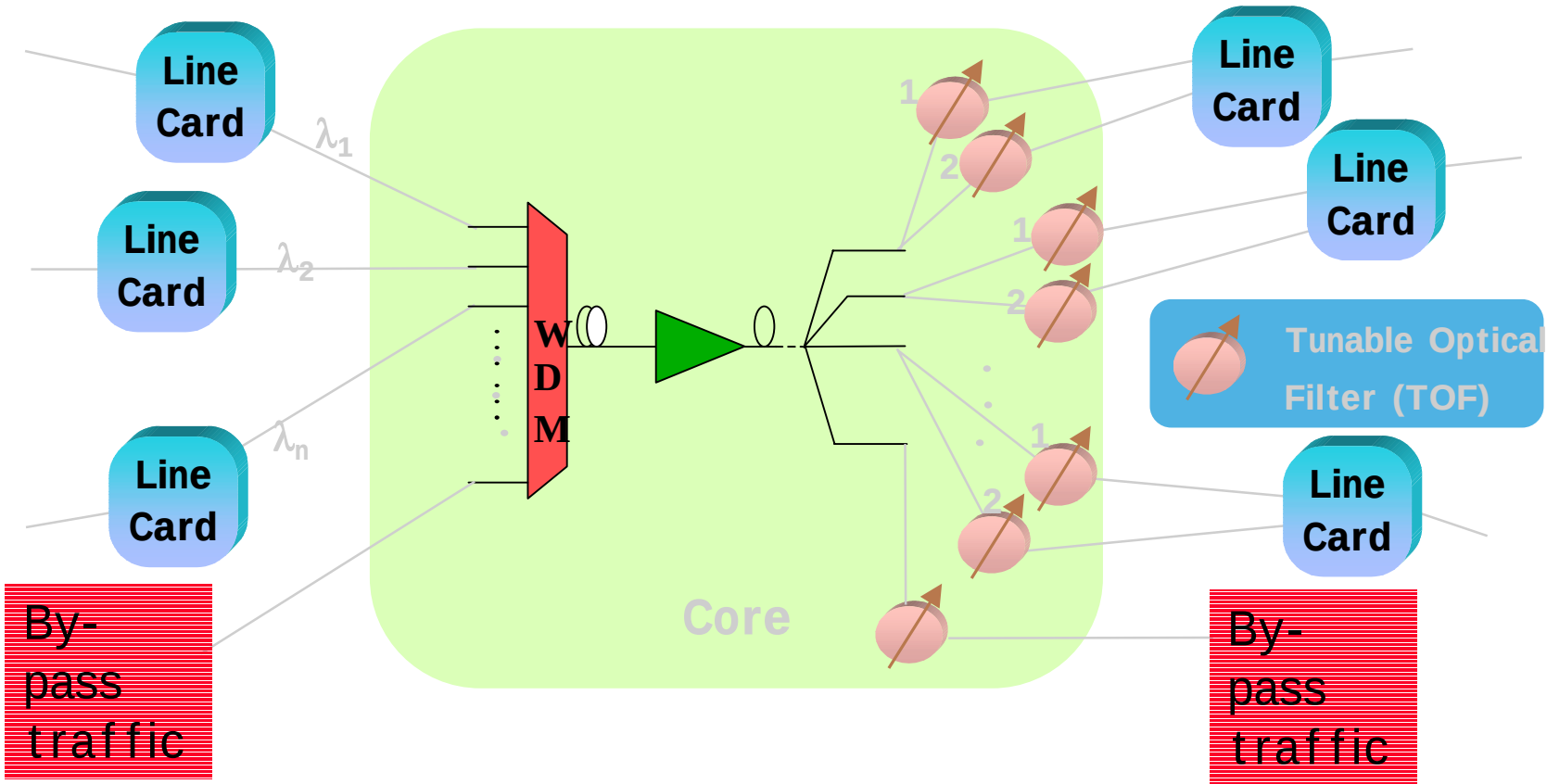
- **Core Competency**
  - All-Raman, Long-Haul, Fiber-optic transmission systems
  - All-optical switching devices & systems
  - Optical switching cores for routers
  - Nonlinear optics in fibers
- **Fundamental Hardware Limitations for 100Tb/s Aggregate Capacity Routers: Switching Core**
  - Electronic switch requires a rack for 2Tb/s switching core
  - Size, power dissipation and cost prohibitive for 100Tb/s
- **Optical Switching Cores for High-Capacity Routers**
  - Low cost, low power dissipation, small size
  - Minimal impact on line cards (use common bay equipment)
  - Functionality of OXC and Router Combined
    - » Same DWDM on outside and inside
    - » Support pass-through traffic as well as traffic to LC's

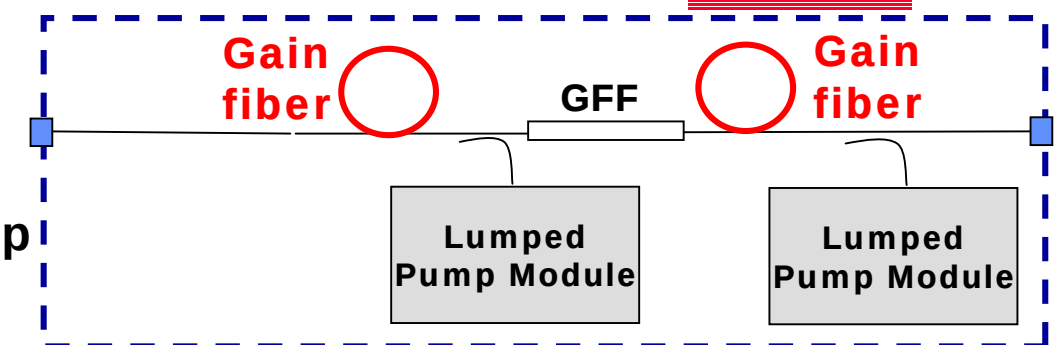
Broadcast & Select Switching Fabric



- Multicast & Broadcast traffic without copies
- OXC/Router functionality combined
- Passive, transparent switching fabric scalable
- LC's minimally impacted because tunable filters and circuits in common bay equipment

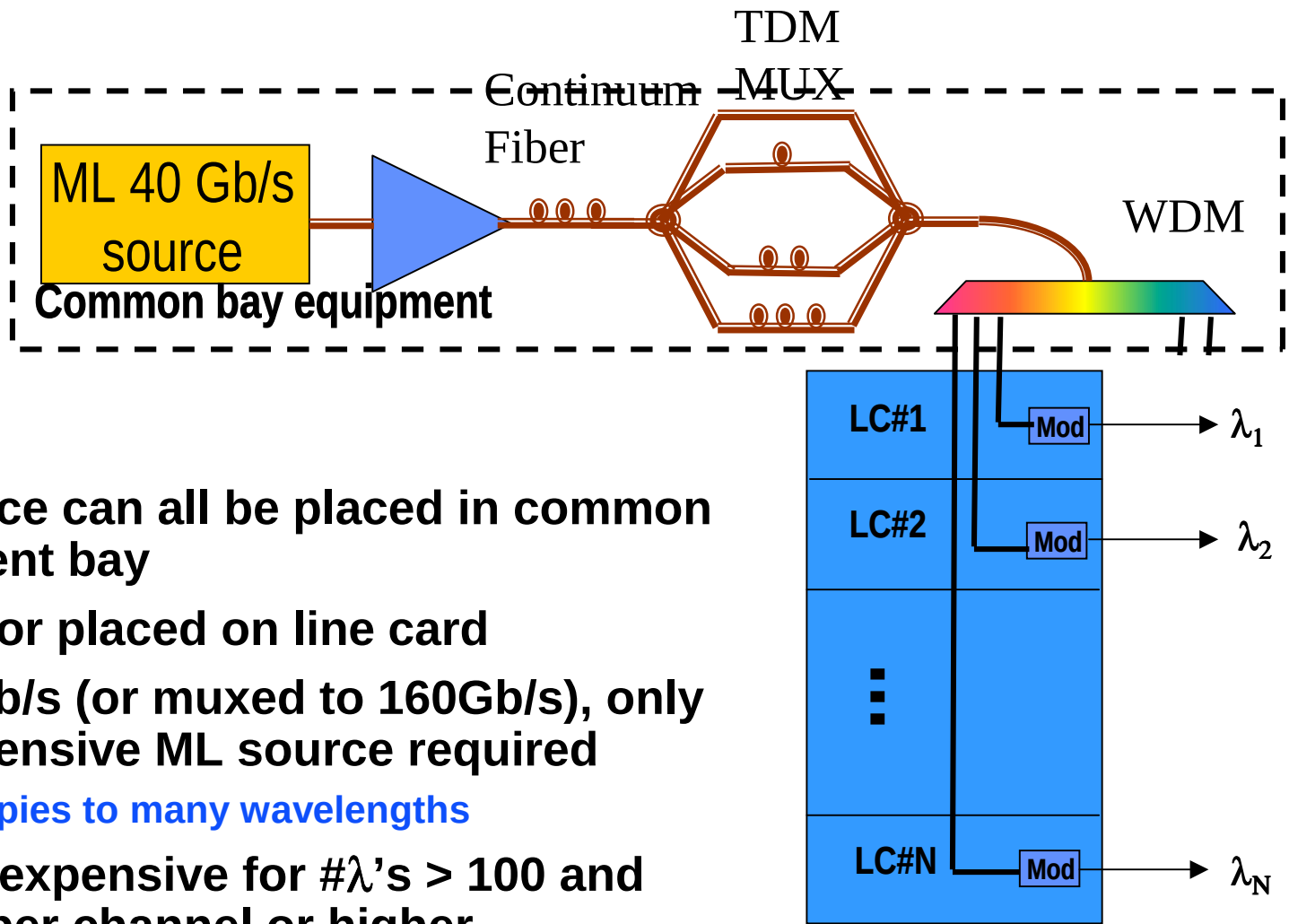
Issue: Scalability from 1/N Loss





100nm Broadband Raman Amp

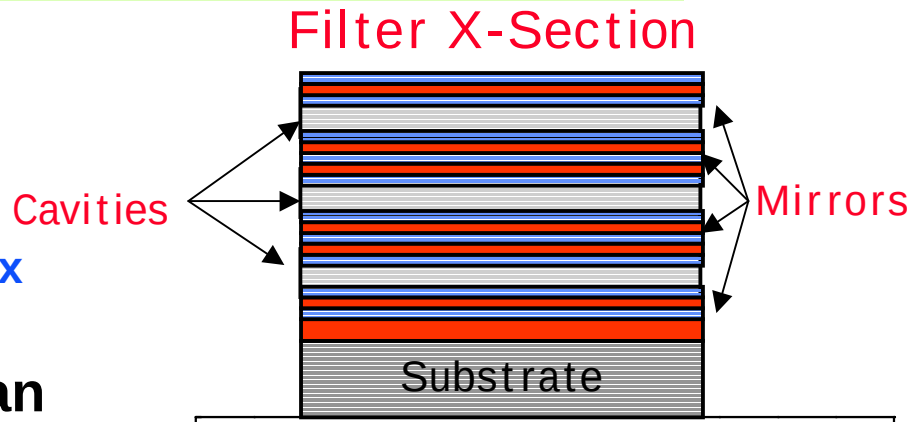
Issue: Common Bay Light Source

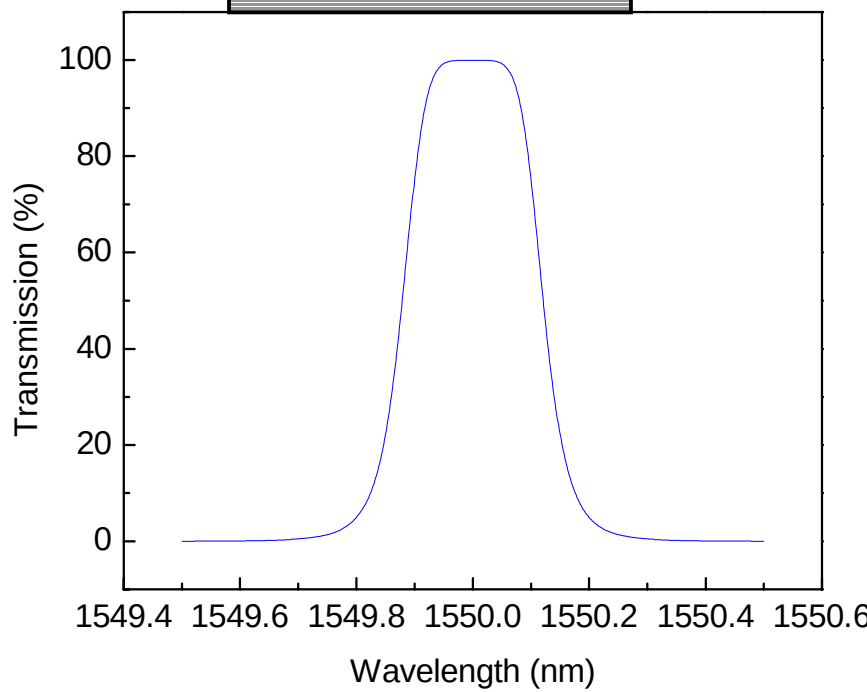


- SC source can all be placed in common equipment bay
- Modulator placed on line card
- For 40Gb/s (or muxed to 160Gb/s), only one expensive ML source required
  - SC copies to many wavelengths
- SC less expensive for #λ's > 100 and 40Gb/s per channel or higher

Issue: Channel Selector and Modulator

- **Optical cavity with electro-optic material**
  - **Tune filter by voltage induced index changes of EO material**
- **High-speed, square-like filter can also be used as surface normal modulator**





Filter characteristics

	1-Cavity Filter	3-Cavity Filter
-1 dB BW	25GHz	25 GHZ
-30 dB BW	625 GHz	100 GHz
In-Band Ripple	<0.25 dB	< 0.25 dB